

## Low Serum Ferritin (low iron)/ Homochromatosis (too much iron) Hypothyroid connection.

**Iron, in addition to iodine, selenium and zinc, are essential for normal thyroid hormone metabolism.**

### **WARNING FOR THOSE ON THYROID HORMONE REPLACEMENT AND TAKING IRON**

Be careful when adding iron to your diet if you are hypothyroid, because taking iron within four hours of taking your thyroid hormone may interfere with the absorption of your thyroid hormone, and make it less effective.

### **WARNING FOR PREGNANT WOMEN WITH HYPOTHYROIDISM**

Pregnant women need to be particularly careful, as most pre-natal vitamins contain iron. You should take your prenatal vitamin, but plan to take it at least three to four hours apart from taking your thyroid hormone, or the iron in your vitamin may interfere with your body's absorption of proper amounts of thyroid hormone.

Biologically, insufficient iron levels may be affecting the first two of three steps of thyroid hormone synthesis by reducing the activity of the enzyme thyroid peroxidase, which is dependent on iron. Iron deficiency, in turn, may also alter thyroid metabolism and reduce the conversion of the 'inactive' T4 to the 'active' T3, besides modifying the binding of T3. Additionally, low iron levels can increase circulating concentrations of Thyroid Stimulating Hormone (TSH)

That severe iron-deficiency leads to anemia as manifested by low haemoglobin and haematocrit on a CBC blood test is well known. However, mild iron-deficiency leads to **low ferritin** in blood tests BEFORE a drop in haemoglobin and haematocrit occurs. An article published in the May 2003 British Medical Journal showed that patients with low ferritin, but normal haemoglobin and haematocrit, have fatigue, that is reversed by iron treatment.

## Treating Iron Deficiency

When a doctor suspects an iron deficiency, the first thing s/he will do is measure the blood level of a protein called **FERRITIN**. Ferritin concentration indicates how much iron is stored in the body. Chronic infection, inflammation or certain diseases causing tissue and organ damage can produce a false reading. In the absence of one of these conditions, if ferritin is low, a doctor will usually assume iron deficiency and begin treatment. This holds true even if there is no obvious sign of anaemia.

The normal range for ferritin is usually between 30 and 300 mg/dL in men and , but it is recommended that for everyone with a ferritin less than 60 mg/dL, they should be given iron treatment. The goal of treatment is to raise ferritin levels to a value between 70 and 90 mg/dL and this is usually achieved with oral iron treatment. Raising ferritin levels to this range may be needed for patients with hypothyroidism to have an optimal response to thyroid hormone treatment. Ferrous Sulphate (325 mg orally, available over the counter) is usually the recommended treatment. Doctors usually recommend one pill a day for a ferritin level between 50 and 60 mg/dL, two pills a day for a ferritin between 30 and 50 mg/dL and three pills a day for a ferritin less than 30 mg/dL.

Patients not responding to iron sulfate may be prescribed IV iron treatment (requiring a hospital visit). All iron products should be taken at least 4 hours after thyroid medication. After taking iron for 3 months, a ferritin level should be re-checked and the dosage adjusted accordingly. Common side effects of iron treatment include constipation and black stools. Patients should increase the fiber

and fluids in their diets to avoid constipation. Patients may need a stool softener such as colace, also available over the counter

A three-month course of therapy for the treatment of iron deficiency is recommended. Some authorities, however, advise patients to continue iron supplementation for six to twelve months. Whichever approach your doctor chooses, it is important that you add more iron in the form of iron-rich foods to your diet and that your doctor treats any correctable cause of blood loss. Patients with ongoing blood loss that cannot be corrected may need, in addition to eating a more iron-rich diet, to continue taking low-dose iron supplements indefinitely.

## **WHY WE NEED IRON**

What many people don't know, is that iron plays a key role, not only in the body's oxygen transport and delivery system, but also in the regulation of metabolism. Iron is needed to synthesize vital substances such as the brain chemical, dopamine, DNA and white blood cells. Thus iron deficiency can do much more harm than merely causing anaemia; it can have widespread effects - from damaging a person's ability to think to weaken their resistance to infection.

It is a common misconception that the amount of iron our bodies absorb is directly related to the amount of iron we eat. While we do get most of our iron through food, getting enough iron is not quite as simple as eating well. For one thing, the ability of our digestive system to absorb iron from the food we eat varies; e.g., those who are iron deficient do not absorb iron as well as those who are not.

Because dietary iron comes in different forms, the percentage of dietary iron absorbed depends on the type of food we eat and what other foods are being eaten at the same time. For example, iron from meat is easier for the body to absorb than iron from vegetable and other sources. In addition, iron absorption can be greatly increased or decreased by various factors. Certain salts, which store iron and other minerals in plant matter, interfere with the ability of the human intestine to absorb them. Chemicals called polyphenols in tea, coffee, cocoa, spinach and oregano inhibit iron absorption as well. Eating more ascorbic acid, which is common in fruits, vegetables and fortified cereals, can improve iron absorption. Calcium inhibits the absorption of iron by an unknown mechanism. This is probably why studies show a correlation between high milk intake and iron deficiency.

## **WHO IS AT RISK FOR IRON DEFICIENCY?**

Many people, including those suffering hypothyroidism, because this can result in a lowered production of hydrochloric acid, that in turn leads to the malabsorption of iron. Iron deficiency can also lower body temperature (common for those who take thyroxine), which causes fewer red blood cells to be produced. Additionally, being hypothyroid can result in heavier periods, causing more iron loss.

Women in their childbearing years have greater iron needs than men as a result of menstrual blood loss, the increased demands of pregnancy and blood loss during childbirth. In addition, anything that causes heavier than normal menstrual periods, for example uterine fibroids, may lead to iron deficiency. Adolescent girls are at particular risk because, out of concern for their weight, many follow diets that reduce the amount of meat they eat at a time in their lives when their iron needs are increasing. Iron deficiency can also be caused by other types of chronic blood loss, including internal bleeding from gastritis and ulcers,

inflammatory bowel disease, parasitic infections (this is more common in Third World populations than developed countries) and haemorrhoids.

The best way to prevent iron deficiency is to educate yourself about your iron needs and the best iron sources, and to use this knowledge to make sure dietary intake keeps pace with your body's demands. Recommended dietary allowances (RDAs) for men over the age of 19 and women over the age of 51 are 8 mg per day; for women aged 19 to 50, the RDA is 18 mg per day. In a typical European diet, major sources of iron are meat, poultry, fish, nuts and seeds, legumes and bean products, green leafy vegetables, raisins, whole grains and fortified cereals. The iron content of some popular high iron foods is shown in Table 1 below:

**Table 1. Iron Content of Selected High-iron Foods.**

<b>Food</b>	<b>Portion Size</b>	<b>Iron (mg)</b>
Total <sup>®</sup> cereal	1 cup	18
Grape Nuts <sup>®</sup> cereal	1/2 cup	8.2
Instant plain oatmeal	1 packet	6.7
Wheat germ	1 ounce (1/4 cup)	2.6
Broccoli	1 medium stalk	2.1
Baked potato	1 medium	2.7
Spinach	1 cup raw	0.8
Dried peach	5 halves	2.6
Raw tofu	1/2 cup	4
Lentils	1/2 cup	3.3
Kidney beans	1/2 cup	2.6
Chickpeas	1/2 cup	2.4
Beef chuck	3 ounces	3.2
Dark meat turkey	3 ounces	2.0
Blackstrap molasses	1 tablespoon	5.0

## **Recognising the Risk**

You can assess your risk of developing iron deficiency by looking for the major risk factors: an iron-poor diet, unusual blood loss, a history of iron deficiency and actual symptoms. A good way to do this is to ask yourself the following questions:

1. Do you consume two or more portions of meat, fish, chicken, nuts, seeds or legumes per day?
2. Do you eat at least six servings of grains per day?

3. Do you generally eat at least one serving of fruits or vegetables containing foods at the same meal as grains or beans?
4. Do you take a calcium supplement or over-the-counter antacid at every meal?

The first two questions ask about consumption of iron containing foods. The third and fourth questions ask about consumption of foods that may affect iron absorption. If you answered no to one of the first three questions or yes to the last question, you may be at risk for iron deficiency.

### **Menstrual and Other Blood Loss**

5. Do you soak through your tampons or pads?
6. Does your period last longer than six days?

If you answered yes to either of these questions, you may be at risk.

Other causes of blood loss to look out for are gastrointestinal, urinary or pulmonary bleeding. Any patient with one or more of these types of blood loss should seek medical treatment or, if they are being treated, raise the issue of iron deficiency with their doctor. Another relatively common cause of increased iron requirements is frequent blood donation. Anyone who donates blood regularly should be screened for iron deficiency during his or her annual check-up.

### **History of Iron Deficiency**

7. Have you been treated for iron deficiency in the past?

Even if a previous iron deficiency problem was treated and easily corrected, whatever caused the deficiency, may remain, and the deficiency may recur. For this reason, anyone who has been diagnosed with iron deficiency in the past should be periodically re-evaluated.

### **Signs and Symptoms of Low Serum Ferritin (many mimic symptoms of hypothyroidism)**

#### **Symptoms:**

- General lethargy
- Unusual fatigue after exercise
- Pica (compulsive eating of non-food items)
- Pagophagia (compulsive eating of ice)
- Depression
- General weakness
- Fast heartbeat
- Palpitations
- Loss of libido
- Brain fog
- Hair loss
- Faintness and breathlessness
- Dizziness
- Long or unusually heavy menstrual periods

#### **Signs:**

- Paleness of the skin or eyes
- Intestinal problems
- Cognitive problems such as impaired learning ability and spoon nails (thin and concave fingernails)
- Bruising that occurs without reason

**Anyone having any of the above should see a doctor as soon as possible to get their Serum Ferritin level tested.**

## HAEMOCHROMATOSIS – Too much iron

**Do you feel tired much of the time?**

**Do your joints ache?**

**Does sex seem a lot less interesting than it used to?**

You could be one of an estimated 150,000 people in the UK who have the genetic disorder 'haemochromatosis', a condition that is almost never diagnosed until it has damaged essential organs such as the liver, heart or the thyroid gland.

And yet a cheap and simple treatment can stop the aches and pains before they start, as well as possibly saving your life.

'I would have been spared so much misery, if the disease had been spotted in my 30s,' says businesswoman Clara Smith, now 62.

A few years ago, Clara was diagnosed with early stage Parkinson's disease. She also has irregular heart rhythms and may need a pacemaker.

Both problems may be linked with haemochromatosis and she believes that with early diagnosis she could have avoided them.

The problem for Clara and tens of thousands like her is too much iron. Normally, people stop absorbing iron from their diet when they've got enough, but if you've got haemochromatosis your body just keeps on extracting it and storing it away in various organs where it becomes increasingly toxic.

The tragedy is that few doctors are aware of the disease and fewer still think of testing for it, even though diagnosis and treatment are relatively simple. The first stage would be a test to determine the iron levels in your body followed by blood-letting - as if you were giving blood - to bring levels down and keep them normal.

'All doctors are aware of the dangers of not having enough iron,' says Professor John Porter of the haematology unit at University College London and one of the UK's top experts in the disease. 'But they rarely think of the dangers of having too much.'

'The irony is that in the early days the symptoms of anaemia (not enough iron) are very similar to having too much - tiredness and lethargy. So these patients are often given the last thing they need - more iron.'

'It would be very easy to make the test for too much iron part of a normal blood test.'

Clara says: 'I started feeling ill in my 30s. I had bad headaches, palpitations and sore knees. I went to the doctors quite a lot. I was diagnosed with an underactive thyroid and given a hormone to correct it but I still didn't really feel well.'

Her health remained poor for several years and although she had various tests, nothing serious showed up.

'I think my doctor probably regarded me as a "heart sink" patient - someone who regularly turns up in surgery with vague symptoms that have no obvious cause. Part of the problem was that I always looked well, tanned and slim, but I felt terrible.'

Unknown to her then, a bronzing of the skin is another sign of the disease.

At one point, because she was always tired, her doctor suggested she might have CFS (chronic fatigue syndrome), a condition many doctors believe is best treated with a form of psychotherapy. On another occasion she was given an iron supplement.

It's all the more surprising that haemochromatosis is below most GPs' radar because it is the most common genetic disorder in the UK — more common than cystic fibrosis, phenylketonuria (a vitamin K deficiency which every baby is tested for) and muscular dystrophy combined.

It is caused by a faulty gene. Every gene we carry has two halves, one from each of our parents. In most people with haemochromatosis both halves of the gene are faulty.

'About one in 200 people who originate from the north of England or Scotland have two faulty halves,' says Prof Porter.

'So if people show up at the doctor's surgery with some of the early signs - such as diabetes or thyroid problems - it makes sense to test their iron levels.'

The very fact that haemochromatosis is so common suggests that at some time in the past it must have helped people survive.

But how? The clue comes from its nickname - the 'Celtic Curse'. If you have Celtic ancestors - Scots or Irish - you have a much higher chance of developing it.

One theory is that it started in parts of Northern Europe where it was hard to get enough iron from your diet.

Some researches believe it originated in Ireland while others think it emerged with the Vikings. It is certainly more common in areas that the Vikings settled, such as the East coast of England and around Dublin. The further south you go in Europe the less common the faulty gene becomes.

So a combination of being Irish, being tired all the time and having a thyroid problem, or diabetes, should set alarm bells ringing. Clara is Irish, but as with many others in the UK, the doctors never made the connection.

The key to her chronic ill health was eventually discovered on the internet by her daughter Susan.

She says: 'I'd been looking at sites that dealt with some of my mother's symptoms when I got an e-mail about thyroid problems that also mentioned haemochromatosis as a possible cause.

'I'd never heard of it but as soon as I looked it up everything fell into place. There were all my mother's symptoms; the tiredness, the tightness in the chest, the pains, everything.'

Iron is a vital part of many proteins and enzymes and it is a key part of the red blood vessels that carry oxygen around the body. An average person will carry a total of around 4g in their body - but if you develop haemochromatosis you may be carrying as much as 15 or 20g. More than 10g and you count as overloaded.

Even when Susan made the connection, a nasty shock awaited them in Clara's medical records.

'It turned out that my iron blood levels had actually been tested 15 years earlier,' says Clara. 'The results showed that far from not having enough iron, my levels were sky high.

'But it was considered so unimportant that I was not even told the result. Instead the doctor just said I had "plenty of everything" and to "go off and enjoy life".

'Actually that was the last thing I did; that doctor's decision to ignore those results set me up for 20 years of misery.'

But there was something else odd about Clara's diagnosis. Besides having a second test for iron in her blood, she also had a gene test, which revealed that - very unusually - only one of the two halves of her gene was faulty.

'By rights I shouldn't have had any problems,' she says, 'but this just shows that the genetics of haemochromatosis haven't been fully sorted out yet.'

Others are luckier. About 20 to 30 per cent of those with two faulty halves don't get the disease and most of these lucky ones are women.

Findings like these have convinced the experts that it's too soon to call for full-scale national gene testing for haemochromatosis. 'Not only are there still too many uncertainties, but knowing you have one or both genes could make for insurance problems later,' says Prof Porter.

'However, just checking the iron levels of likely patients would be a major step forward.'

A genetic diagnosis of haemochromatosis of one person in a family usually prompts children and spouses to be tested. And for Susan, who for years had been suffering the same sort of symptoms as her mother, it showed that she has both faulty halves of the gene. Her father was also a carrier, with one faulty half.

'It came as a shock,' she says, 'and I'm still coming to terms with it, but hopefully being diagnosed early will allow me to avoid more serious problems.'

Susan's brother, now in his 40s, had no symptoms and thought he was perfectly healthy. But he, too, has a set of faulty genes and hugely raised iron levels.

'There are thousands of men in the UK with both sets of the dangerous gene variations who think they are perfectly healthy.' says Prof Porter. 'The first time they know anything is wrong is when they keel over with a heart attack or suddenly find that their liver has packed up'.

Men with the disease are more likely to show up with damaged organs sooner because they don't regularly lose blood through their lives as women do - menstruation protects women by flushing iron out of their system.

At the moment, the official NHS Direct website barely mentions haemochromatosis; just in passing as a rare cause of cirrhosis - serious liver damage.

According to Prof Porter: 'Thousands of lives could be immeasurably improved and millions of pounds worth of treatment avoided if it this genetic disorder could move off the mortuary slab and into the consulting room.'

*The Haemochromatosis Society [www.haemochromatosis.org.uk](http://www.haemochromatosis.org.uk)  
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